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Abstract
In this paper, we study two applications of image-processing technology. The first study is to estimate the distance between a human face and a CCD via the image of the face. The second study is to inspect good-or-bad gears through the picture of the gears. In the first study, fractal dimension analysis is used to detect the location of human eyes in the image of a human face, so that one can measure the gap between eyes in the image. Then we establish a polynomial equation representing the relation between the distance of CCD apart from human face and the gap of human eyes in the CCD image through a set of experimental data. Through this equation, one can estimate how far a CCD is away from a human face by taking an image of the human face. Some experiments are conducted to verify the effectiveness of such estimations. We also suggest how to detect the location of human mouth after locating the eyes. The detection of eyes, mouth, and CCD distance will be useful to many studies. One of the possible applications is to design automatic feeders to assist the dining of disabled persons. In the second study, we proposes a method to automatically inspect the good-or-bad quality of spur gears during manufacturing process. Since a regular spur gear has a given number of teeth and each tooth has certain size. Such properties could be treated as ways to examine the quality of gears produced in a gear production line. This paper uses image-processing technology to measure the number of teeth and the associated area of each tooth from the captured image of a spur gear. The measured data are then screened through a set of rules designed based on the properties of normal gears. A gear is considered to be normal and good if its measured data meet the set of rules, otherwise it has defect and is bad. Experiments are conducted to verify the plausibility of the proposed approach, and the results are quite satisfactory.
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